

Puget Sound Partnership Stormwater Management Needs Assessment Review

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Parametrix

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Purpose

- ▶ **The Partnership contracted with BES and Parametrix to assess needs related to municipal NPDES permit implementation and retrofits to improve urban storm water quality in the Puget Sound basin**
- ▶ **Both are important to recover Puget Sound, and both are expensive**

Scope of Analysis

- ▶ To better quantify financial needs and benefits of strong local programs and retrofits
- ▶ 3 months to do *coarse level of analysis*
- ▶ Intention is to inform near-term stormwater funding & investment decisions for PS
- ▶ Should be considered along with other major initiatives for improving water quality

NPDES MS4 Permit Program

- ▶ Estimate total local current costs for Phase I's/II's (permittees) in the PS basin
- ▶ Estimate water quality improvements resulting from program
 - Quantitatively: TSS
 - Qualitatively

NPDES Methodology

- ▶ All Phase I's provided Total & M&O Costs for 2009; also TSS removed
- ▶ 15 Phase II's provided Total Costs only
- ▶ Phase II's from Clallam, King, Kitsap, Pierce, Skagit, Snohomish and Thurston County represented
- ▶ Phase I & II total costs normalized & extrapolated by population to the full Puget Sound
- ▶ Heterogeneous data

NPDES MS4 Costs

- ▶ Permittees spend \$40/capita/year (average)
- ▶ M&O costs estimated at 35% of Total based on Phase I experience (range 23-51%)
- ▶ M&O costs defined as costs of facility (pipes, CBs, detention facilities, street surfaces, vaults, etc) cleaning, solids disposal, minor repairs, & equipment; does not include capital program or other permit costs

Estimated 2009 Total NPDES MS4 Costs

Total Annual (2009\$) NPDES Investments for Phase I & II Permittees	~\$160-\$170M (\pm)
Total Annual - Phase I	~\$ 63M (\pm)
Total Annual - Phase II	~\$103M (\pm)

NPDES MS4 Permits Findings

Total TSS 2009 load reduction

~233,000 tons

- Phase I's only
- Includes legacy load reductions
- 2009 weather loadings high
- Heterogeneous solids data

Total TSS 2009 load reduction
Phase II's

Unknown

NPDES MS4 Permits Findings

- ▶ Phase I & Phase II permittees represent about 45-50% of the land and about 88% of the population in the PS basin
- ▶ NPDES Permit regulates only publically operated MS4s within geographic coverage

Retrofit Approach

- ▶ **1996 and 2006 GIS Data sets**
 - Ecology's Western WA Land Cover Change Analysis Project
 - By Puget Sound, County and WRIA
 - Ranges of Imperviousness Categories
 - ▶ Sum of imperviousness within pixels
- ▶ Use 80% TSS Removal as proxy for water quality improvement; acknowledge other benefits
- ▶ **Identify and Cost BMPS**
 - Ecology Emerging Technologies (Proprietary and Non-Proprietary)
 - Treat 1 acre, 100% impervious, 2-yr/24-hr storm
 - No land acquisition costs (highly variable)
- ▶ **Apply literature values to estimate TSS removal**

Potential Puget Sound Retrofit Investment

- ▶ 360,000 impervious acres in Puget Sound basin (2006 GIS data)
- ▶ ~90% assumed built without current standard water quality treatment features (GIS data; permittee communications)
- ▶ 9% of total acres are 80-100% impervious
- ▶ 50% of total acres are 50-100% impervious
- ▶ About half impervious acres are public
 - Based on Kitsap & King County roads data, roughly half is estimated to be public; half private

Retrofit Analysis Findings

**Table 1-1.
Puget Sound
Imperviousness**

	Range of Percent Imperviousness (1/4 acre mapping unit)				
	0–19%	20–49%	50–79%	80–100%	Total
Total 1996 Impervious Acres per Range	37,000	121,000	102,000	60,000	320,000
Total 2006 Impervious Acres per Range	47,000	128,500	116,000	67,000	358,500
Percent increase 1996 to 2006	27%	6%	14%	12%	12%

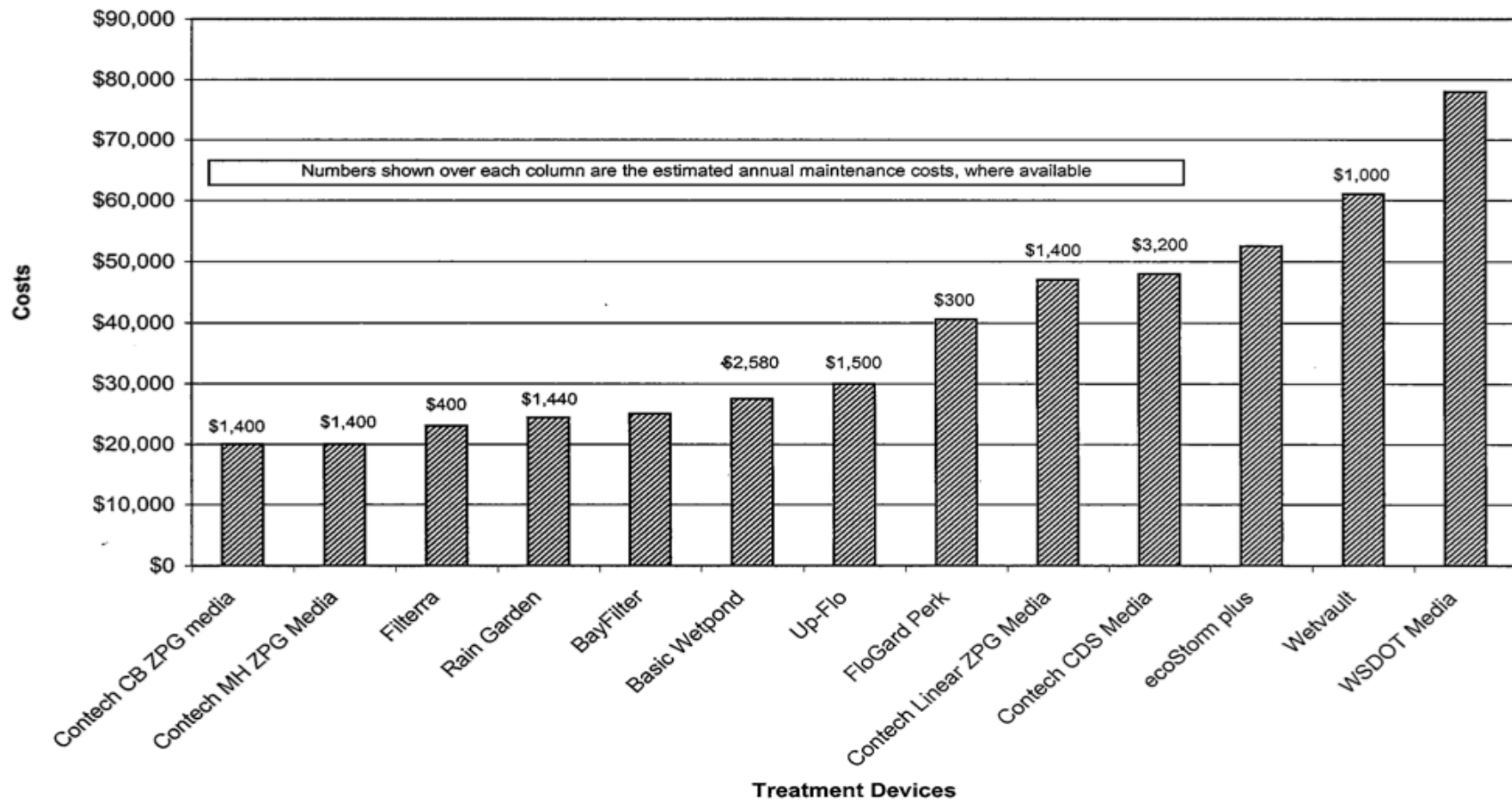
Total Puget Sound Acres = 8,800,000

Potential Puget Sound Retrofit Investment

- ▶ **Range of water quality retrofit capital costs:**
 - \$20,000-\$78,000 per acre
 - Does not include land acquisition costs
- ▶ **Range of annual M&O costs for retrofits:**
 - \$300/acre-\$3,200/acre

13 BMPs – Emerging Technologies

Installation and Maintenance Costs for Treating a Unit Impervious Acre



Potential Total Investment

	Percent Imperviousness per Acre Addressed	
	80–100%	50–100%
Impervious Acres (1996) Addressed	60,200 acres	162,300 acres
Capital Investment Range	\$1.2B - \$4.7B	\$3.2B – \$12.7B
Recurring Annual Maintenance Investment Range	\$18M - \$192M	\$48M - \$519M

Potential Retrofit Investments by County (80-100% Impervious Acres)

County	Impervious Acres (80 - 100% Coverage, 1996)	Treatment of 80 to 100%	
		Average Capital Costs (\$1M)	Average Annual Maintenance (\$1M)
Clallam	1,800	\$88	\$3
Island	1,000	\$50	\$2
Jefferson	300	\$17	\$1
King	28,500	\$1,400	\$53
Kitsap	2,300	\$116	\$4
Mason	450	\$22	\$1
Pierce	14,000	\$720	\$27
San Juan	150	\$7	\$0.3
Skagit	2,800	\$140	\$5
Snohomish	9,300	\$465	\$17
Thurston	2,700	\$132	\$5
Whatcom	3,600	\$180	\$7
Totals:	66,900	\$3,337	\$125

Potential Retrofit Investments by County (50-100% Impervious Acres)

County	Impervious Acres (50 - 100% Coverage, 1996)	Treatment of 50 to 100%	
		Average Capital Costs (\$1M)	Average Annual Maintenance (\$1M)
Clallam	5,000	\$250	\$9
Island	3,300	\$170	\$6
Jefferson	1,100	\$60	\$2
King	66,700	\$3,300	\$120
Kitsap	6,700	\$300	\$12
Mason	1,600	\$80	\$3
Pierce	32,500	\$1,600	\$60
San Juan	500	\$30	\$1
Skagit	7,400	\$370	\$15
Snohomish	22,500	\$1,100	\$40
Thurston	6,200	\$300	\$10
Whatcom	8,500	\$430	\$15
Totals:	162,000	\$7,990	\$293

TSS Removal from County Retrofits

(50-100% Impervious Acres)

County	Estimated TSS Removed (TSS)	Estimated Capital Cost per Ton TSS Removed (\$/Ton)	Estimated Maintenance Cost per Ton TSS Removed (\$/Ton)
Clallam	6,900	\$69,000	\$3,000
Island	5,800	\$53,000	\$2,000
Jefferson	2,300	\$47,000	\$2,000
King	82,800	\$75,000	\$3,000
Kitsap	11,100	\$56,000	\$2,000
Mason	3,400	\$44,000	\$2,000
Pierce	43,700	\$70,000	\$3,000
San Juan	1,700	\$31,000	\$1,000
Skagit	10,900	\$63,000	\$2,000
Snohomish	31,700	\$66,000	\$2,000
Thurston	9,600	\$61,000	\$2,000
Totals	209,900	\$68,000	\$3,000

Need & Means to Prioritize

- ▶ **Triage: EPA 2010 Guidance**
- ▶ **Watershed Plans**
- ▶ **NPDES Retrofit Plans**

Current vs. Future Analyses

- ▶ **Coarse retrofit estimates**
- ▶ **Not prioritized**
- ▶ **Better information coming:**
 - **Juanita Creek Watershed: projected 2010-2012**
 - **WRIA 9 Watershed: projected 2013+**
 - **NPDES monitoring program: Proposal by SW Monitoring Work Group, 2010**

Ecology Stormwater Funding 2006-2011

Capacity Funding - Permit Implementation	
FY 2006	\$2.7M
FY 2007-2009	\$8.3M
FY 2010	\$3.4M
FY 2011	\$23.5M
Stormwater Retrofits and Low Impact Development	
FY 2007 – LID Grants – Puget Sound Basin	\$2.5M
FY 2008 – Stormwater related Projects	\$20.9M
FY 2010 – Stormwater related projects	\$5.25M
FY 2011 – (Not yet Disbursed)	\$23.45M

Phase II State Funding

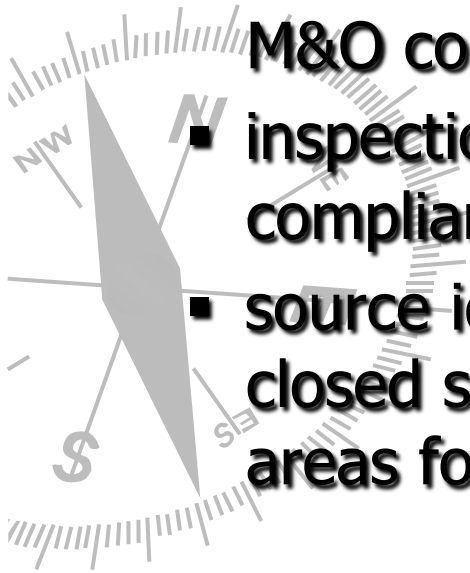
- ▶ Ecology grants cover < 6% on average of the Phase II *current* annual funding needs
- ▶ Current funding sources are not permanent
- ▶ All Phase II permittees interviewed anticipate that the next NPDES permit cycle will *increase their funding need substantially*

Federal & State Investments in Wastewater Retrofits by Comparison

- ▶ 1970-2000, \$61.1B in Federal Construction Grants Program funding to upgrade primary to secondary treatment**
- ▶ 1970-1988, \$16.1B in State Revolving Loan Funds for water quality improvements**
- ▶ Approximately \$206B in equivalent 2010 dollars**

Next Steps in Analysis

- ▶ **Determine level of investment in retrofits**
- ▶ **Estimate resource need over 5 years**
(2012-2017 to accelerate:
 - **removal of legacy loads for Ph I/IIs to achieve baseline M&O condition**
 - **inspections to accomplish 100% coverage and 70% compliance**
 - **source identification for 303D listed, closed shellfish, closed swimming beach & superfund recontamination areas for toxic, nutrient & pathogenic origins**



Summary & Questions

- ▶ Needs Assessment complete by fall, 2010
- ▶ Will inform a vision & investment strategy for urban stormwater in the Puget Sound basin
- ▶ Non-Point Sources yet to be addressed
- ▶ Questions?

